Occupational HAZARDS & SAFETY

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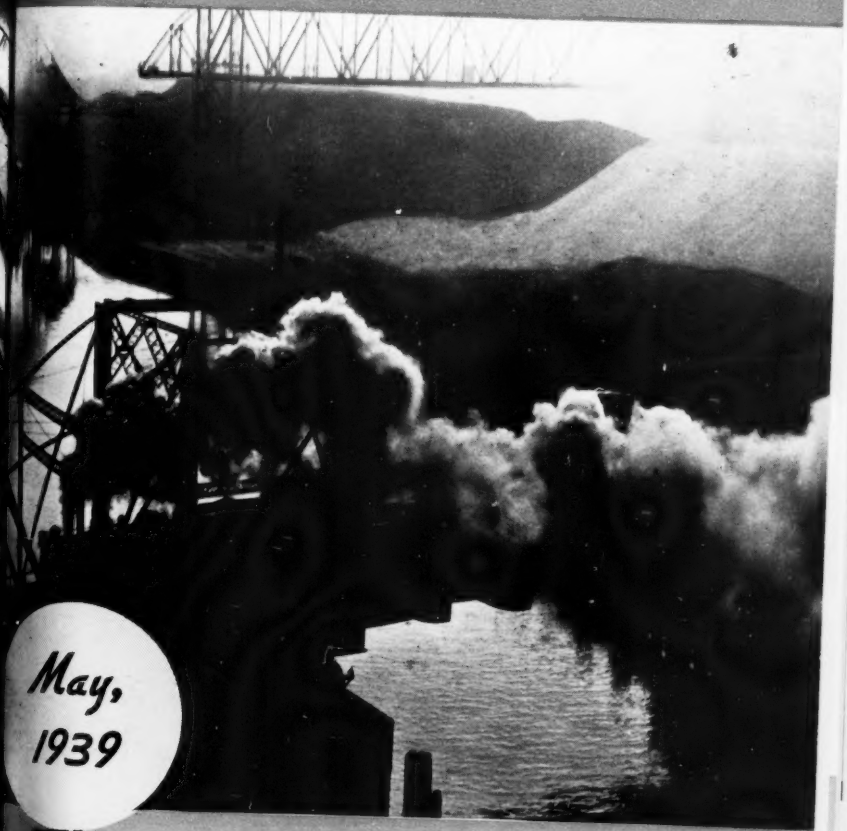

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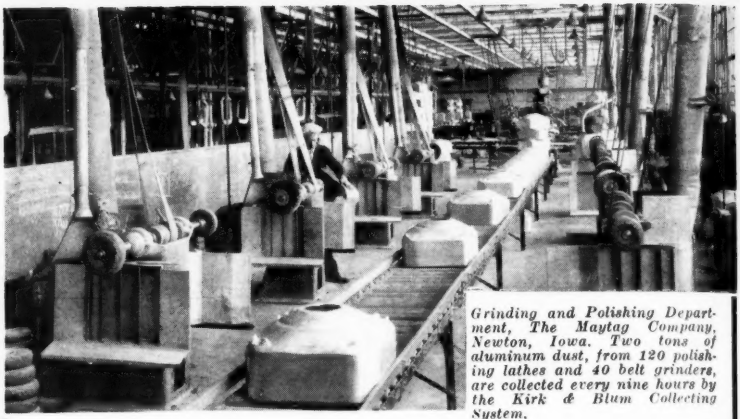

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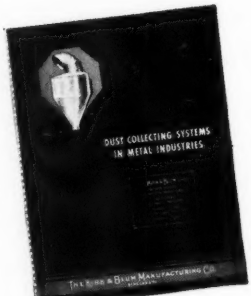

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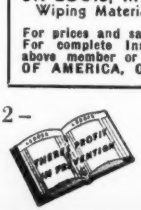

THE importance of providing every reasonable and practicable safeguard for the protection of worker's health is emphasized to industrial management in two different articles in this issue of *Occupational Hazards & Safety*. The article, "Compensation Goes Beyond the Letter of the Law," and the silicosis case, discussed in "Right Off the Docket," point out the large part negligence—failure to provide protection—plays in determining the financial liability of employers in occupational disease cases.

In his article, Mr. Roberts brings out the fact that occupational diseases may be compensated under many different theories—action in common law suits based on negligence, under workmen's compensation acts, under statute because of unforseen nature of contraction, and by liberal interpretation of statute. The cases reviewed show that disabilities have been compensated in states where no occupational diseases were included in the workmen's compensation act; in states where some diseases were included, but not the disease for which the award was made; and in states where the statute does not speak specifically of occupational diseases, but by judicial interpretation the statute was held to cover all injuries arising out of employment, occupational diseases or otherwise.

The silicosis case, discussed on page 29, decided very recently in the Ohio Supreme Court, illustrates concretely how judicial interpretation may cause the employer to consider his liabilities for occupational diseases in an entirely different manner.

Ohio has a rather broad schedule cover-

ing occupational diseases. Heretofore, the Ohio Supreme Court has held that diseases not included in the schedule were not compensable and that common law action could not be brought by an employee against an employer for damages suffered from any disease not included in the schedule. The cases decided involved damages for silicosis. Silicosis was not included in the original schedule in Ohio, but was made compensable in 1937. The cases in question arose before that time. Thus, common law action for damages was brought by the employees.

In handing down its opinion, the Court held that an employee could bring action in civil suits against an employer for non-compensable occupational diseases directly caused by employer's negligence.

The Employer's Problem

It is not our purpose here to discuss the opinion, per se. Our interest lies in the effect it has on the employer in discharging his responsibilities for the health of workers. The decision establishes a definite responsibility to the employer for non-compensable occupational diseases in the case of negligence. That is the sum and substance of the decision. It means that the employer, to provide himself with maximum protection from financial liability, must take every reasonable and practicable safeguard for the protection of his employees.

Payments for disabilities or death from occupational diseases, whether through compensation claims or damage suits in common law, are tangible and direct costs which show up on the profit and loss statements. There is one definite and concrete way to reduce this cost—take steps to install preventive equipment and provide protective devices where some hazard may exist before the disease has a chance to arise. It comes down to this fact—There is profit in prevention. Further, the cost of prevention is fortunately much less than the uninformed employer usually assumes. This is particularly true if he engages a competent industrial hygienist to make an advance survey of his requirements.

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Useful Free Literature

The publications briefly described in this service department are prepared by manufacturers' technical experts. The data they contain on equipment, supplies and prevention methods applies to varied phases of occupational hazard problems.

127—EYESHIELDS

A new two-color folder issued by the Jackson Electrode Holder Co. describes and illustrates eyeshields for all kinds of industrial applications.

128—VACUUM CLEANERS

U. S. Hoffman Machinery Corp. has prepared a new booklet on industrial vacuum cleaning, listing and illustrating equipment as well as numerous industrial applications for removing the dust menace in plants.

129—HEAT FAG PREVENTION

A folder of the Morton Salt Co. giving questions and answers on the prevention of heat fag with the use of salt. Non-technical and of particular interest to executive and operating management in "hot" industries.

130—WASHROOM SANITATION

An attractive and informative booklet of the Scott Paper Co., discussing all the factors important to clean and healthful washrooms. Describes the advisory service available to industry.

131—SAFETY EQUIPMENT

Pulmosan Safety Equipment Co. announces the issuance of several revised pages for insertion in their general catalog. The revisions include new and improved products.

132—DUST COLLECTION

An 8-page folder of the Parsons Engineering Corp. includes drawings and descriptions of the design and operation of dust arrestors. Gives operating specifications and typical installations.

133—LADDERS & SCAFFOLDING

Bauer Mfg. Co. has issued a 34-page, pocket-sized catalog illustrating and describing a wide variety of ladders and scaffolding for industrial and commercial use. Indicates best ladder or scaffolding applications.

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134—FIRST AID

A folder of Hynson, Westcott & Dunning, Inc. discussing mercurochrome as a product and its use in first aid. Contains interesting data on infections and prevention.

135—SALT TABLETS

A folder of Fairway Laboratories, Inc., listing prices and service unit identification on salt tablets and dispensers. Illustrates units with descriptive material.

136—PRESSURE FANS

A catalog of the B. F. Sturtevant Co., giving complete information, including capacity tables, dimensions, corrosion resisting tables and applications on pressure fans. Includes charts and 2-color illustrations.

137—DUST CONTROL IN METAL INDUSTRIES

A spiral bound booklet of Kirk & Blum Mfg. Co., giving valuable data on dust control in the metal industries. Includes specifications on various installations and equipment. Illustrated with in-use photos.

138—PORTABLE VACUUM CLEANERS

A folder of the Breuer Electric Mfg. Co. with many illustrations showing the use of portable vacuum cleaners in various industrial operations. Includes performance reports and operating details.

139—TESTS FOR LENSES

The impact, transit and polariscope tests for goggle lenses are described in an interesting folder of Willson Products, Inc.

140—SAFETY LADDERS

A folder of the J. R. Clark Co., showing features of safety ladder construction and the use of various types in industry.

141—NEW EYE PROTECTION BULLETIN

A completely illustrated 8-page Bulletin on eye protection equipment has just been published by the Mine Safety Appliances Company. It features a complete line of goggles and spectacles, welding helmets and shields, combination protective hats with welding shields or goggles and several additional new items.

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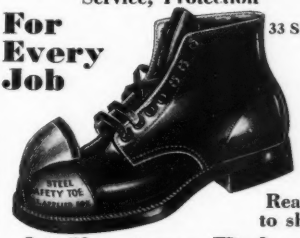

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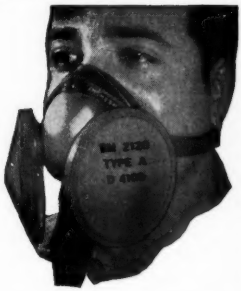

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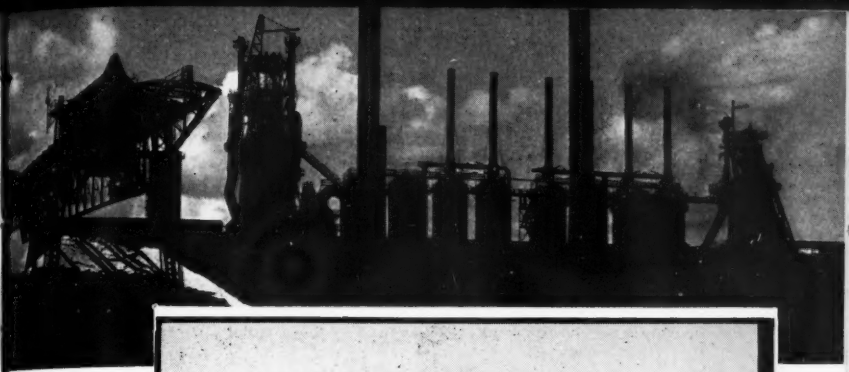

OCCUPATIONAL Hazards AND Safety

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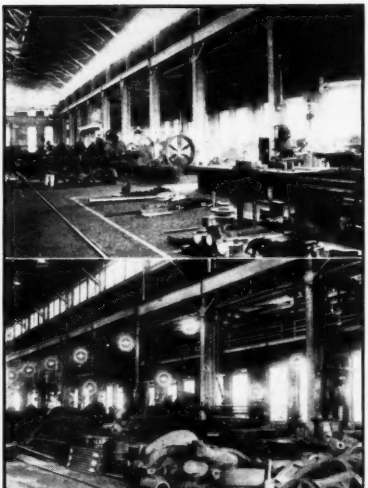
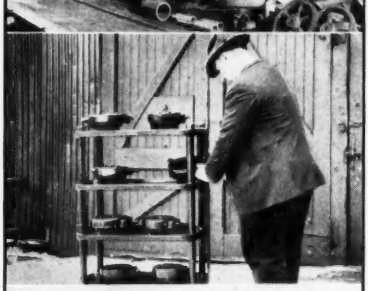
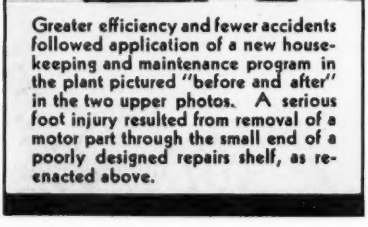
Safety and Maintenance

Maintenance in industrial operations—the proper care of machinery, equipment and tools—are essential in sustaining an all-around safety program in virtually all industrial concerns.







Greater efficiency and fewer accidents followed application of a new housekeeping and maintenance program in the plant pictured "before and after" in the two upper photos. A serious foot injury resulted from removal of a motor part through the small end of a poorly designed repairs shelf, as re-enacted above.

By THOMAS E. HUGHES,
Sup't., Electric Light and Power and Mechanical Dept., Duquesne Works
Carnegie-Illinois Steel Corp.

SAFE workers are one of the greatest assets a company can have. To have safe workmen, there must be an active safety organization for the entire plant. The function of this safety organization is to see that all work is performed in a safe manner, that machinery and equipment are safeguarded, that employees are provided with all reasonable protective devices, and that workers are informed in the proper use of equipment. It is the duty of operating and maintenance supervisors to train their men to practice safety at all times.

Instilling safety in workers—to the point where they think and act safely as naturally as they perform their work—is not enough. It is also necessary that employees have good tools, work at properly guarded machinery, have wide free aisles and safe floors for their passage through the plant, have safe stairways and safe equipment. In general, good housekeeping must be maintained throughout the plant. Clean, properly ventilated buildings, mills and shops lend a good atmosphere in which men may work in safety. Poor working conditions, such as improperly guarded machinery, oil and grease on machinery and floors, unsuitable methods of getting on and off equipment and crane

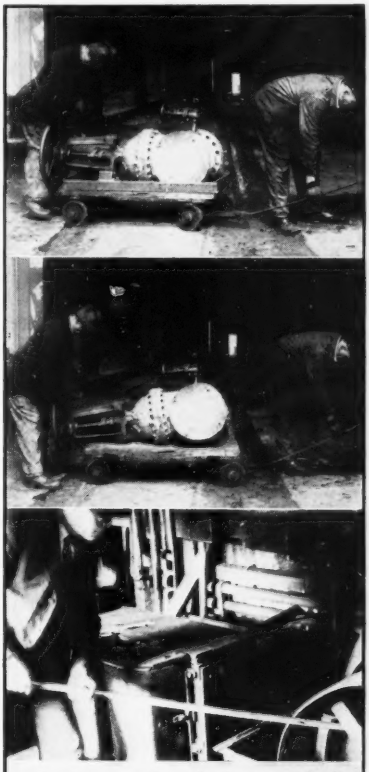
runways, lead to accidents, as well as poor workmanship. Good housekeeping pays maximum dividends in safety and general overall costs.

The maintenance department organization has a definite responsibility for the safety of workers in the performance of their work. This same organization is responsible for the safety of operating their production crews, insofar as proper maintenance of equipment and development of improvements (based on the observation of operating difficulties) can contribute to the safety of such crews.

Personnel Training

The success of a maintenance department is dependent largely on its personnel. The size of the industry, the number of men employed in the combined service groups, is not so important as the organization of the department. The success of the maintenance department lies in the coordination of the functions of the service groups into a single unit, having as its purpose the supplying of safe and efficient service. This calls for a centralized responsibility which is conducive to efficient service and maximum safety.

To train men along the lines of safety, the department heads first must believe whole-heartedly in the safety program. They in turn pass this safety spirit on to the foremen who have the opportunity and responsibility of teaching safety to their men. Unfortunately, many employees, particularly those with long service whose familiarity with the hazards of their work has developed a contempt for danger, oftentimes feel that safety rules are all right for the other fellow but not for themselves. Another obstacle in the development of good safety practices is the tendency of individuals to take it upon themselves to suspend or ignore a recognized safety practice. This is often the case when it ap-



A rupture and crushed toe resulted from transporting a heavy machine on a sideless hand truck. The accident's cause, and a prevention, were re-enacted in the two upper photos. A workman was killed when a fellow worker struck an unlocked switch with his elbow, as re-enacted above, starting up a machine power drive.

pears that production may be unduly interrupted or that the completion of a job may be delayed if strict adherence to some safety rule is involved.

Standard safety rules should be available to all employees and should be strictly adhered to if any safety program is to be successful. Proper discipline is also essential to the conduct of any effective program. Continual emphasis on the fact that no one worker can elect to exempt himself from the rules and they cannot be suspended at will for the sake of production are important.

Photo courtesy Dayton Safety Ladder Co.

The main objectives of a maintenance organization may be defined as the safety of the maintenance department personnel, the minimizing of interruptions to production, the control of maintenance costs, and the observation and recording of difficulties encountered in the operation and repair of equipment for the benefit of subsequent design and operation. All of these objectives are in complete harmony, and progress achieved by attention to any one of these items contributes to the advancement of all the other objectives.

The Human Factor

The challenging, ever-changing factor in a safety program is the control of human behavior, varying as it does among individuals and varying again in one individual, due to changes in physical condition and mental attitudes and distractions. It is this human factor which requires major attention in any safety program. Some of the more important problems which must be reckoned with from this standpoint are:

FIRST—Attention must be called to the possible suffering, loss of earnings and permanent reduction in earning power connected with injuries, and the immediate effects on families and dependents.

SECOND—Confronted with the facts that "no workman can be an efficient workman unless he is a safe workman," and that "accidents do not just happen—there is always a cause," it appears rather obvious that one of the first jobs is to make sure that each man is given duties best suited to his aptitudes, abilities and disposition. I know of men who had poor safety records on one given type of work and have seen the same men establish a high safety rating when transferred to other work. Efficient workmen is the desire of every plant, but this goal cannot be achieved unless a state of safety mindedness exists at all times.

THIRD—The average workman does not grasp the real importance of any problem presented only in a verbal manner. He must be shown. I am inclined to believe that our safety records, as well as workmanship, would improve if more men were shown rather than told how to perform their

work. There are various methods which may be used to accomplish this purpose, but we believe that one of the most practical and convincing methods is with the use of photographs. Photographs can be taken readily and they quickly convey definite ideas as to the general conditions concerning the point in question, and aid all concerned to visualize more accurately the before and after conditions of accidents.

There are a number of safety problems which are no more intangible than many of our engineering problems. Therefore, I feel that our safety problems can be controlled to advantage by employing methods of control similar to the various schemes now proving so successful for cost finding, cost control, general study and analysis of our maintenance work.

Our program of maintenance prevention, which requires a schedule of routine inspection for the purpose of detecting minor faults and correcting them before they develop into major break-downs, has been successful to a large degree. The maintenance groups also carry on a development study for the purpose of improving existing equipment, working on the premise that replacements in kind will not be made unless a development study indicates that no better substitute is available.

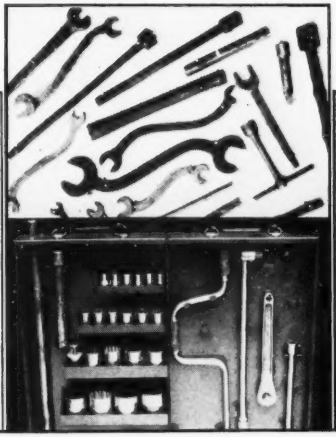
Accident Cause Finding and Accident Control

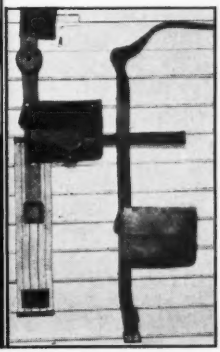
A method that permits a quick analysis of accident records will indicate clearly what is responsible for accidents to the workmen as a group or as individuals. The records must be so constructed that a study of them will indicate accidents caused by fail-

[*Continued on page 38*]

The cost of a well made and guarded wire rope sling, as compared with a home-made affair, is negligible in light of the hazard of scratches, if not more serious accidents, it minimizes.

Kits of vari-sized wrenches, as opposed to home-made and usually distorted tools, makes for standardization as well as safety. Fabric safety belts are wisely used to replace leather.





Ornamental carving and sand-blast cleaning of granite columns with excellent safety precautions. Note the neat steel scaffolding, the wire mesh guards, the adequate walk-way and the worker's protective clothing, respirator and goggles.

High, Wide and Handsome

A MILLRIGHT helper in a pulp mill was called to check an overhead motor. It was necessary for the worker to use a ladder to reach the job. The ladder he used (the one which was handiest, of course,) was too short, requiring him to place his feet over a line shaft to reach the motor platform. The helper reached the motor safely, via the ladder but, in descending, the revolving shaft caught his trouser cuff, throwing him off balance and causing him to fall to the floor some 10 feet below. The resultant injuries, a broken wrist and internal injuries, were an expensive lesson to teach the use of a ladder long enough to reach the job.

In another case, a carpenter, with several years experience, used a ¾" plank as a platform from which he could work to replace a broken window pane. One end of the plank was placed on a cat walk and the other end on a girder, about 8 feet apart. The weight of the worker broke the board, throwing him to the floor. A fractured pelvis was the costly lesson in this case.

Such accidents are daily occurrences in industry, and needlessly. Working overhead under any circumstances is hazardous. Failing to use a proper ladder or scaffold and failing to use common sense are invitations to accidents.

Every plant has overhead machinery and equipment which require regular inspection and routine check-up. Also there are various operations and maintenance jobs that demand only occasional attention. In either

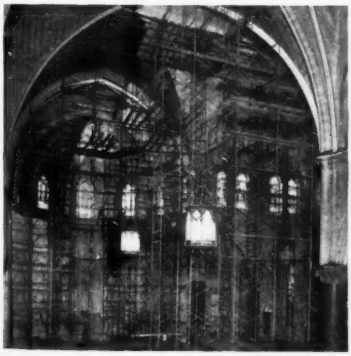
case some method of access to high places is required. Ladders and scaffolds fill this need. Thus, ladders and scaffolds are important parts of the equipment in every plant.

Loose planks, on rope-swung beams, a dangerous make-shift.

Recognition of and close adherence to five simple rules are basic to the prevention of accidents while working in high places.

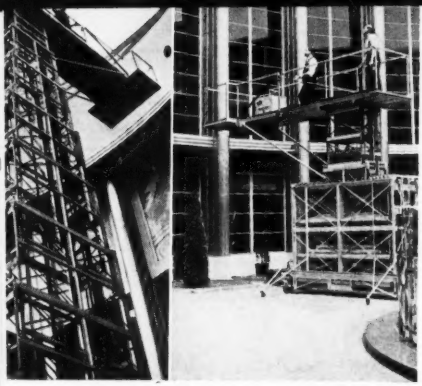
1. *Purchase only ladders and scaffolds made of the best materials and soundly constructed.* State ladder codes, setting forth minimum requirements for the safe construction of ladders, will help you as a guide in selecting good equipment. An additional guide is to make certain that the ladder has been manufactured according to the specifications contained in the National Ladder Code of the American Standards Association.
2. *Choose the ladder or scaffold to fit the job*—taking into consideration such factors as height required in using, weight which the equipment must bear, freedom of movement needed by the worker, nature of the surface on which the ladder or scaffolding rests both top and bottom, whether the use of the ladder or scaffold at any one location is to be temporary or permanent.
3. *Use common sense and care in placing ladders and scaffolds in working positions.* Ladders can be damaged and broken the same as other equipment. Damaged ladders not only endanger workers using them, but also run up repair and replacement bills.

A steel scaffold set-up for safely and conveniently handling a church redecorating job.



A stone masons' job expedited and made less hazardous by a modern scaffolding set-up.

Photos courtesy Safway Steel Scaffold Co.



A unique telescoping platform, with a minimum height of 8′ 9″ and a maximum of 46′. The main frame is of steel, the telescoping frames being made of aluminum.
Photo courtesy Economy Engineering Co.

4. *Take proper care of ladders and scaffolds.* This includes storage in proper places and positions; regular inspections to see that rungs, side-rails, braces, bolts, platforms, supports and other parts are in good condition; and immediate repairing of damaged parts, or discarding of irreparable equipment.
5. *Have available at all times the ladder or scaffolding for the job.* The stockroom should be supplied with sufficient equipment to meet any emergency, as well as to fill the normal demand, and with the proper type ladder or scaffold to meet plant requirements.

Types of Ladders

Single Ladders—Along with the step ladder, and platform ladders, the single type is probably used more frequently in industry than other types. This does not necessarily mean it is used properly in each case. In many instances the use of a different type ladder would be a safer practice. For example, many times two men will work at the top of a single ladder. This practice is not recommended. In such cases the use of a platform type ladder or some form of scaffolding should be used.

Single ladders over 30 feet in length should not be used. Legs should be properly supported on an even base, both side-rails at the top should be against a solid support and in no circumstances should the ladder be supported at the top with just the middle of the top rung in contact with the support. Unless these precautions are followed, the ladder may either side-slip or slide away at the bottom when a person's weight is placed on the rungs. Another precaution to follow is to make certain that there is adequate space behind the rungs to permit a firm footing.

Step-Ladder—Because they are supported at four points, if proper placement is made, the step ladders are one of the safest types to use. However, if the four legs are not on an even and firm base, wobbling, spreading, or tipping may result in a serious accident and injury. Step ladders are designed to be used as a working platform. The maximum safe height recommended for this type of ladder is 20 feet. When opened, the steps should be in a horizontal position. Steps should be wide enough to give a safe foot-hold and should be reinforced in some manner and securely screwed or bolted to the side-rails. The spreader, used to hold the front and back sections in an open position, should have the automatic locking device in perfect working order and firmly caught when the ladder is opened. A frequent source of injury in handling step ladders is the spread-

[*Continued on page 39*]

Beyond Just "The Letter of the Law"

The trend of court decisions is definitely towards application of the common law, of considering an occupational disease the same as an injury, wherever specific coverge has yet to be enacted.

By Hilton E. Roberts
Member Ohio and New York Bars

AT THE present time, commissions, legislatures and courts in many states are grappling with the question of occupational diseases in the field of workmen's compensation. What the ultimate outcome will be in the various states, and when it will be achieved, is indefinite. Authorities agree that the goal to be reached, with respect to compensation, is certainty —industry to be certain of its liability, or perhaps more accurately, its responsibility; the employee to be certain that he is protected and the extent of protection.

While commissions in their reports, and courts in their decisions, may suggest ways and means to this goal, the actual solution, in the form of laws, is a function of the legislature. However, the legislative process is frequently slow and, while it moves toward the passage of adequate legislation, industry must contend with conditions as they actually exist at the present.

In view of this situation, it is the purpose of this article to point out that the occupational disease problem, from a legal stand-point, is more complex than may appear at first glance, and that industry, if it would know fully of its responsibilities, should have a complete knowledge, not only of the hazards of its occupations, and the means of combating them, but also of the laws and the interpretation of those laws governing claims that may arise because of such hazards.

Diseases Compensated Under Many Theories

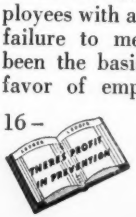
Regardless of definition or terminology of occupational diseases, numerous decisions in various jurisdictions have made awards both in proceedings under Workmen's Compensation Acts, and in actions at law, for diseases which from an ordinary viewpoint would be designated as "occupational." Disabilities have been compensated in States where no occupational diseases were included in the Workmen's Compensation Statute; in States where some diseases were included in the Statute, but not the disease for which the award was made; and in States where the Statute did not speak specifically of occupational diseases, but by judicial interpretation the Statute was held to cover all injuries arising out of employment, whether from occupational diseases or otherwise. Contained herein are cases illustrative of the above points. They are not intended to indicate that the law is in any particular jurisdiction—there have been changes resulting from subsequent court decisions, and additional legislation. The cases are presented to show the devious reasoning by which courts have made awards for industrial disabilities, and to suggest that it may be wise for management to look beyond the bare letter of the law to determine its responsibility.

Actions Based on Negligence

At common law the employer is under the duty to furnish his employees with a safe place to work. The failure to meet this obligation has been the basis for many verdicts in favor of employees. This duty has been held by courts to require each industry to know of its particular hazards, both latent and patent; to possess a knowledge of scientific facts pertinent to its specific problems; and to apprise itself of, and furnish to its employees, such safety appliances as are available to make working conditions safe.

For example, in a jurisdiction where "bronchial asthma" was not an occupational disease compensable under the Workmen's Compensation Act, a verdict was rendered for a disability resulting from bronchial asthma, in an action at law based on the failure of the employer to furnish a safe place to work. The asthma was caused by the inhalation of fumes from carbon tetrachloride which was sprinkled in a grain elevator to destroy weevils in the grain. The negligence of the employer consisted in failing to provide adequate ventilation facilities to disperse the injurious fumes.[1]

In another case, a verdict was rendered for damages resulting from silicosis contracted while working on a rock crusher. The plaintiff introduced evidence showing that respirators and dust blowing devices were used in other plants engaged in similar work. The court said, ". . . and particularly is the master chargeable with a knowledge of risks ascertainable only through a knowledge of scientific facts which an uneducated man is not presumed to know" and further, "The dangers of silica dust had been investigated by medical authorities, and the United States government, and reports thereon were available" also; "Where simple devices may be obtained at a reasonable cost, the master should procure them for the protection of his employees."[2]



In another case, carbon monoxide and carbon bisulphide poisoning was the injury for which a judgment was rendered. The poisoning was suffered while repairing and testing blow pipes, in which work acetylene gas was used. A fan was provided to ventilate the room from the gas and fumes generated, but it was inadequate for the purpose. The defendant contended that since certain occupational diseases were compensable under the Workmen's Compensation Act, and the disease involved in this case was not so included, no action at law should lie for such disease. The court rejected this defense, holding that the inclusion of some disease in the statute did not preclude a common law action for an occupational disease not so included, when brought on the theory that the employer was negligent in failing to provide a safe place to work.[3]

A case involving creosote fumes manifests clearly that the law may change without legislation, and largely because experience and advancement in scientific knowledge necessitate the change. In this case, the fumes causing the injury emanated from railroad ties that had been treated with creosote. The employer sought to absolve himself from the charge of negligence, alleging that he could not have been presumed to know of the danger, since cases of injury from fumes of creosote treated ties were of rare occurrence. The court stated, "Courts, in the repeated holding that the harmful effects of creosote fumes, if harmful, is by reason of novelty excluded from contemplation, cannot be expected to so hold after repeated cases present experience from which employers may become so informed as to have the question of harmful effects in reasonable contemplation. . . . Time seems to be developing creosote fumes manifestation into an occupational disease."[4]

Manganese poisoning, lead poisoning, arsenical poisoning, pulmonary asbestosis, and practically all other industrial diseases have been the subject of judgments in actions brought on the basis of employer's negligence.

Coverage Under Workmen's Compensation Acts

There have been many awards granting compensation for disabilities resulting from diseases, under Workmen's Compensation acts which did not include "occupational diseases," either specifically, or by "blanket" provisions covering all diseases. The courts, in allowing such awards, have technically and legalistically sought to distinguish such diseases from occupational diseases but, from the layman's point of view, and frequently from the legal point of view, the distinguishing features are so fine to be practically imper-

1. Clark vs. Banner Grain Co. (Minnesota) 195 Minn. 44 (1935)
2. Allen Gravel Co. vs. Curtis (Mississippi) 173 Miss. 416; 161 So. 670 (1935)
3. Downing vs. Oxweld Acetylene Co. (New Jersey) 112 N.J.L. 25 (1933)
4. Sweaney vs. Wabash Ry. Co. (Missouri) 229 Mo. App. 393; 80 S.W. (2nd) 216 (1934)

ceptible. In any event, industry's concern is with substance, not theory, and an "occupational disease" by any other name is just as much a problem.

Coverage by Unexpected and Unforeseen Nature of Contraction

Certain diseases have been found to be compensable under compensation acts, because they were construed to be "injuries arising out of employment," or "accidental injuries," or "injuries arising from accident," in the liberal sense of those terms. The defense that they were "occupational diseases," and not covered by the statute was overcome, and the disease was brought under the wording of the respective acts, by reason of the fact that the diseases were suffered under unexpected or unforeseen circumstances.

In a case where the employee contracted lead poisoning because the mask he was using was too large, and he inhaled more dust by reason thereof than he would have otherwise, the court stated: "Evidently Mr. Rue did not expect the use of this mask to make him sick or he would not have used it. Certainly the event of his inhaling a dangerous amount of lead dust while using the mask was unexpected to him, and, of course, the dropping down of the mask as he worked and the letting in of an excessive amount of lead dust by reason thereof, as well as the mask being too large for his use, was sudden."[5]

Silicosis, developed after six weeks work on a rock crusher, was held to be an "injury arising from employment," rather than an "occupational disease." The court contrasted the giving out, or "blow up" of a lung after continual grinding by silica dust, to a case where a workman is injured while driving his employer's automobile when the tire "blows up" as the result of continual grinding from the rocks on the road. One was deemed to be just as much an "accident" as the other.[6]

Perhaps the most famous of the cases, wherein the basis for bringing an action under compensation statutes was fortuitous circumstances, was the Maryland case involving phosphorus poisoning contracted in a fireworks factory. The reasoning for the court's determination is contained in this oft quoted statement: "It was by chance the employer did not use due care, and by chance that the vapor of phosphorus was there where its noxious foreign particles could be inhaled by the girl. It was by chance that the inspired air carried those particles into her system, sickening her, and causing a necrosis of the jaw after fortuitously finding a lesion. The injury inflicted on her body was accidental by every test of the word, and its accidental nature is not lost by calling the consequential results a disease."[7]

Nephritis, resulting from a chill suffered when hot pulp, which had been dumped into the basement when a pipe broke, had to be flushed out with hot water;[8] and, caisson disease resulting from the failure of a co-employee properly to operate a reducing chamber;[9] and arsenical poisoning contracted while firing smelters;[10]

[*Continued on page 28*]

5. Rue vs. Eagle Picher Lead Co. (Missouri) 38 S.W. (2nd) 487 (1931)
6. In re Pero (Wyoming) 52 P. (2nd) 690 (1925)
7. Victory Sparkler & Specialty Co. vs. Francks (Maryland) 147 Md. 368 (1925)
8. United Paperboard vs. Lewes (Indiana) 117 W.E. 276 (1917)

Anti-Air Attack Weapons

Air Filters in Air Conditioning and the Handling of Low Dust Loadings in Industrial Operations

By FRED W. LIEBERG
Dust Control Engineer

IN THE March issue of HAZARDS AND SAFETY, Mr. Ernest F. Fisher of Boston, Massachusetts, gave us considerable food for thought in his article "Dust and Fume Control Engineering." The real problem, as Mr. Fisher points out, is the separating of the finer dust from the air.

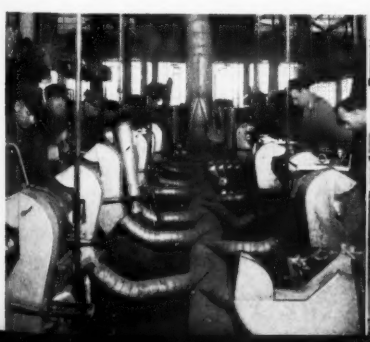
Dust collecting equipment removes dust from the air to improve working conditions; to permit re-circulation of cleaned air; to reclaim valuable material; to reduce building maintenance and for other good reasons.

We will discover that the *air*, which has been the carrier of the dust, may be valuable, as for instance, heated air in the winter, and cooled air in the summer. To permit a volume of air to be exhausted, which ordinarily would not be necessary for circulation purposes, is wasteful, since fuel or refrigeration has been employed at some cost. In many instances we are faced with two problems. One is that of conserving the air and the other separating the dust from the air. The two problems are closely related, because air should not be recirculated unless the fine dusts have been separated and retained.

In the January issue the writer discussed methods employed for collecting *static* dust—dustlessly. We were considering the removal and disposal of dust which had settled on floors, walls, ledges, pipes, etc. We are now considering "dust in suspension" which was referred to in that article. Dust which is suspended or floating in the air may be moved by any system which will move the air in which it floats. Such dust may be collected through exhaust systems; by dust arrestors already referred to, and through air conditioning systems by filters.

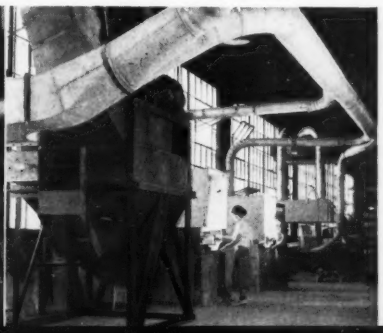
Dust particles varying in size from ten microns down are the arch enemy of clean and healthful plant conditions. There are available today various types of equipment and different

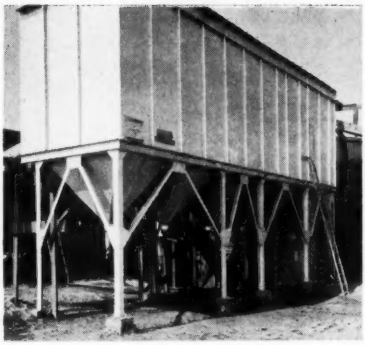
Unit exhausts portion of dust control system in buffing department of Olds Motor Works.



Power unit of dust control system in a Westinghouse plant.

Photos courtesy Kirk & Blum Mfg. Co.





Hoppers and discharge vents of dust control system of American Abrasive Metals Co.
Photo courtesy American Foundry Equip. Co.

Steam heat and vapor removal hoods in a silk dyeing and printing company's plant.
Photo courtesy the Falstrom Company

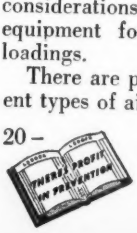
methods for atmospheric air cleaning and for dust control and elimination. Physical conditions in each plant, the nature of the material being handled, the operations involved and the purpose for which the equipment is desired are some of the factors which should determine the method and equipment which will perform the job in question most efficiently and economically. Larger dust particles are being successfully collected through the use of cloth screen and bag arrestors and cyclone separators. Low velocity filters or wet type impingers are used to trap finer dust particles. Where high temperatures are encountered the wet type collector and the electric precipitator are used.

This article is concerned primarily with air filters and their use in atmospheric air cleaning and the handling of low dust loadings. Air filters for these applications involve different considerations than dust collecting equipment for handling high dust loadings.

There are probably a dozen different types of air filters available ranging from the paper throwaway to the automatic impingement type. And there are styles and sizes (or capacities) to fit into exacting requirements.

The rapid strides made in the air conditioning field, for commercial and domestic applications, have aided considerably in the development of the air filter, for, as will be shown, the filter is the key to the operation of any air conditioning system.

Before liberating the air which has been a carrier of dust, it can be passed through air filters, and contamination can be reduced in proportion to the velocities permitted and type of filter employed. It is a mistake to permit the air stream to pass through the filters at the maximum allowed velocity. It is safer, and, from a maintenance stand-point, wiser, to offer plenty of filter area. For instance, at 20 velocity feet per minute, employing a good filter medium, dust particles as small as 10 microns can be effectively retained. Of course any filter which functions efficiently must be constantly cleaned or replaced. If we are out to get the dust, we necessarily



must see to it that the filter is in condition to do its job. Obviously a clogged up filter cannot function efficiently. Furthermore, if the filter is not given proper care, the system as a whole, no matter whether delivering heated or cool air, or just trapping dust, will be thrown off balance, because, when figuring the requirements of a heating or cooling job, consideration is given to areas over which air must pass to receive heat or cold. The speed of the air passing over those areas must be constant for any set condition, and the volume of air must be maintained in order to maintain the proper velocity.

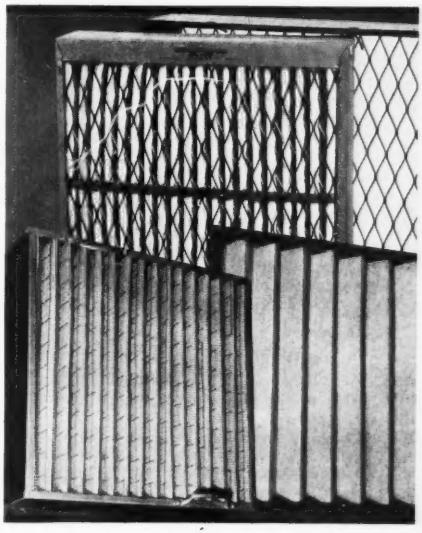
Kinds of Air Filters

Air filters come in dry, viscous-treated and wet types. With the exception of the last, they come in thicknesses from ¾″ to 8″. The industrial type are usually 2″ and 4″ thick. The sizes of the dry and viscous (oily adhesive) filters are 20″ x 10″; 20″ x 16″; 20″ x 20″; 25″ x 16″; 24″ x 24″ and 20″ x 25″. The sizes most commonly used are 20″ x 10″; 20″ x 20″ and 25″ x 16″. There are several viscous treated filters of the throw-away type. A filter on the baffle principle has oil adhesive on the surfaces. The air deposits its dust on the surfaces. This filter is known as a cleanable filter since the filter may be washed with a solvent and re-treated with oil. The resistance is low and air flow is not impaired because of service.

The dry filters come in paper; in felt; in felted cotton and in felted spun glass. The paper and felted cotton are rightfully throw-away filters although they can be cleaned. However, they deteriorate and the filtering ability is impaired and collapse is likely. The felt filters and the felted spun glass filters are cleanable. The former at option and the latter as a matter of good practice, since the media is held in place by wire screen, and cleaning with a solvent can be easily accomplished. Initial resistence on the dry filter is generally low. A straight mat type air filter 20″ x 20″ x 4″ would offer a *face* area of 400 square inches and when passing 600 cubic feet of air per minute the *filtering* velocity would be 216 F.P.M. The same size filter with a pleated felted cotton type of media would offer *filtering* area of 4000 square inches and when passing 600 cubic feet of air per minute the *filtering* velocity would be 21.6 F.P.M. To trap fine dust it is essential that velocity be kept down.

Clockwise: Renewable cotton cartridge throw-away dry type filter; Cleanable spun glass type of filter; and reloadable, pleated type, using paper, cotton or felt.

Photos courtesy Davies Air Filter Corp.



The Nurse in Industry

An industrial nurse service, coupled with a physician on retainer, offers an inexpensive solution to the health problems of the plant too small to afford full-time medical and dispensory employees.

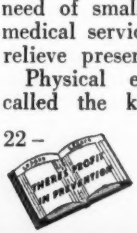
By Joanna M. Johnson
Supervisor, Industrial Nursing Division
Employers Mutual Liability Insurance Co.

THE trained nurse is an established factor in a large segment of industry. Only a small percentage of industrial firms engage full time physicians. The majority engage part time physicians who are responsible for the medical program and subject to call. A great number of industries have no one physician serving, but depend upon a panel of physicians designated by the employers. It is in these plants that the nurse takes on the most important role. Unfortunately, the physicians or surgeons from such panels seldom, if ever, see the industrial plants and, therefore, know little of the working conditions and manufacturing hazards involved. It is essential that the nurse be able to translate to the physician the complaints of the worker which pertain to his illness or injury. It is here that the relationship of the nurse to the physician is very important as there is little of supervision in these plants from a professional standpoint.

Management of small plants seeks medical advice regarding the establishment of health programs. If these programs are to serve the ultimate need of small industries recognized medical service must find a way to relieve present haphazard methods.

Physical examinations may be called the key-stone of industrial health work. They should be made by a well qualified physician. However, they should not be made with the idea of weeding out the physically handicapped, but rather to promote safe and proper placement of the workers and as a stimulus for lessening turnover. These examinations may reveal many defects, but if they are not tactfully brought to the attention of the patient for correction, the examinations lose their true value. No one is as well qualified to aid the physician in the correction of these defects as is the industrial nurse. She has learned of the home conditions of the worker and knows frequently his financial responsibility and thus she may be of assistance in arranging a suitable budget. Through the personnel the nurse may assist in arranging means for the payment of such medical bills as may be found necessary on account of non-industrial illnesses or disabilities. The family physician to whom the patient is referred for treatment will be pleased to work with the nurse to gain the correction of such defects.

Because of compensation laws, records of industrial injuries and illnesses are usually more complete than the records of non-industrial injuries and illnesses. Record keeping is one of the most important duties of the



nurse in industry. Such records tend to serve as a barometer of the safety and health activities of the industry. Separate daily record sheets for injuries and illnesses simplify record analysis and the daily or weekly summary sheets facilitate the monthly and annual records.

Recording of illnesses is not the usual procedure in the smaller industries. Where this practice has been established, it is invaluable from a standpoint of indicating to management where remedial measures may be instituted. Especially is this true in the matter of respiratory diseases. The practice of keeping illness records is to be commended, for unless employees who have been ill report upon their return to employment with a discharge from their physician it is not known whether or not they are fit to perform their former work, and proper placement cannot be instituted. Findings on absenteeism have shown that the average worker's loss of employment is fifteen times greater for non-industrial injuries and illnesses than for industrial injuries. As much of this is preventable, we have additional tangible objectives toward which an industrial health program should be directed.

Post-Accident Service

The nurse plays a definite part in the program of accident prevention. Her field in this work is almost unlimited, but she also has a post-accident job to do in many cases—rehabilitation.

Rehabilitation may be established through physio-therapy. However, one of the greatest aids in rehabilitation is the opportunity for the worker to resume occupation of a lighter nature so as to ultimately return to his former work. This gives confidence, and it aids in dispelling fear of permanent disability.

The well trained nurse will not choose to work without standing orders from a physician. When a panel of physicians is maintained, the advice of one of these physicians should be sought, and standing orders signed by the physician should be followed. It is not possible that a physician always be present, but he should be sufficiently closely associated with the plant so that he and not the nurse, bears the responsibility for diagnosis and treatment of injuries and illnesses.

Handicaps to Progress

The handicaps or obstacles which lie in the progress and spread of industrial nursing are as follows:

1. *Inadequate Preparation*—We have post-graduate courses in public health nursing in the United States for the last 30 years and we have today 19 courses accredited by the National Organization for Public Health Nursing. Although these courses cover a great deal of work in public health, they do not include a sufficient amount of information along lines of accident prevention and occupational diseases. They do not include sufficient amount of time for practical field work in industry, nor do they give a thorough training in the fundamental principles and proper execution of first aid which is essential to the education of a well trained industrial nurse. Public health courses and nursing education is becoming aware of this inadequate preparation and ways and means are being made for their improvement.

2. *Lack of Supervision*—The nurse working alone in industry has a distinct handicap. She must constantly

draw upon her own resources if she is to become a success in this field.

3. *Lack of Organization*—For the past several years the national organization of public health nursing has made a special effort for organization of the Industrial Nursing group. In Wisconsin, the writer's state, industrial nurses take an active part in the local safety councils' meetings and activities, and industrial nurses' clubs are formed for the purpose of keeping in touch with current industrial problems and furthering their education on subjects which have a direct bearing upon their work.

Type C-5

There are thirteen other types.

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THIS *light*, well ventilated eyeshield has full metal binding, is adjustable at *any angle* and is positively *non-fogging*, under atmospheric conditions. The fiber visor guard deflects sparks without checking ventilation. Adaptable for a wide range of industrial uses, this shield is available in clear, smoked, amber and light green. *Send for folder.*

JACKSON ELECTRODE HOLDER CO.
Dept. O-1
15122 Mack Avenue Detroit, Michigan

The well prepared nurse has a distinct contribution to make to the health of any group in the community. In no service, however, does her potential usefulness exceed that of industry. It is to be hoped, therefore, that the future will bring about realization of greater development in this important field of prevention.

Protectors In Standard Safety Code

This is the second in the series of recommended protectors taken from the revised copy of "The American Standard Code for the Protection of Head, Eyes, and Respiratory Organs."

Group B

Processes where protection from dust and small flying particles is required. Examples: Scaling and grinding of metals, stone dressing, where quartz is not involved, and some woodworking operations.

Protectors

Goggles—Three styles of goggles are permissible: rigid, non-adjustable bridge (or adjustable metallic bridge) with side shields; flexibly connected lens containers shaped to conform to the configuration of the face; and rigid, non-adjustable bridge (or adjustable metallic bridge) without side shields.

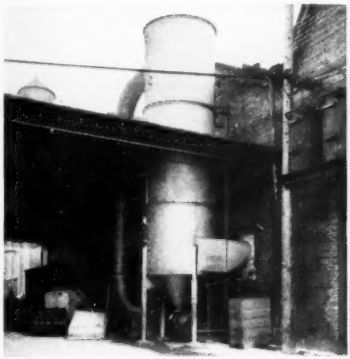
Lenses—Lenses shall transmit not less than 70% of the visible light from the standard source specified.

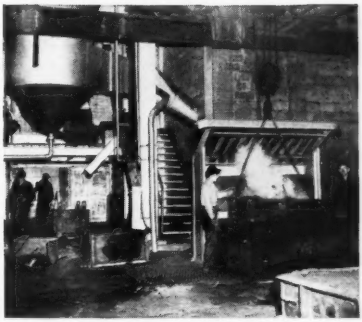
Eyecup Goggles—Eyecups shall be made of rigid, non-inflammable material that will not readily corrode and will not discolor the skin and can be sterilized without deterioration. Proper ventilation shall be provided and the goggles shall be fitted with a headband or headgear of cloth, leather or other suitable material, which will retain them in their proper position with reasonable comfort.

STANDARD STOKER

Rids Its Plant of Dust and Fumes!

—completely, efficiently, at low cost and with no maintenance cost with a "Uni-Flo" Hood and a Multi-Wash Dust Collector.





"Uni-Flo" Hoods, **a recent development of Schneible engineers, are designed to collect dust and fumes from open circuit processes or operations which cannot be completely enclosed or shielded by intake hoods, such as foundry shake-outs, mixers, screens and grinders. They have adjustable louvers and can be mounted at any angle — above or on any side of the equipment — no interference with cranes, conveyors or other handling equipment, yet they draw in all of the dust and fumes arising from dust creating operations.**

The Multi-Wash Dust and Fume Collector **shown, installed at the Standard Stoker Company, Erie, Pa., collects dust and fumes gathered by the "Uni-Flo", and other hoods developed by Schneible engineers, and completely washes them from the air in a quick, simple operation. No filters, bags or screens are used — no moving parts — nothing to break, burn, clog or freeze — nothing to maintain.**

Yet, this positive dust and fume control system actually collects and disposes of all dust particles (of every size) at the lowest cost per thousand cubic feet of cleaned air. They operate on what it costs to maintain ordinary dust collecting equipment.

Sizes and types for every plant — every industry. Get the complete story and list of over 50 representative installations in Bulletin 110, gladly sent on request.

CLAUDE B. SCHNEIBLE CO.

DUST SUPPRESSION ENGINEERS

3951 LAWRENCE AVENUE, CHICAGO — OFFICES IN PRINCIPAL CITIES

This month in *Washington*

By **W. T. Cameron**
Chief Safety Adviser, Division of Labor Standards, U. S. Department of Labor

I WAS recently asked: "What *personal* industrial safety services are available to the average employer whose activities do not warrant an elaborate safety program and the expense of a full-time safety director? Is there anyone who will come into my plant to make a survey of conditions, list the places where accidents might occur, sit down and outline the type of safety organization I need to fit my plant, perhaps help me form a safety committee? In other words, to help me build a safety program to fit my needs?" My answer was, "Yes, right here in your city there are a number of safety experts who will do just that." As I began to enumerate available people I was amazed to find, first, how many there were, and, secondly, how much personal safety service was available without charge.

First of all, I listed the state factory inspector assigned to the local or district office, whose services all employers are entitled to as taxpayers. In most states the factory inspector is rapidly becoming a competent, trained safety consultant and adviser on all phases of industrial safety. He visits many plants, sees many operations, talks to many safety directors, and brings first-hand knowledge on a variety of safety subjects gained from first-hand experience.

Next I listed the full-time safety director employed in the plant "next door" whose operations warrant the services of a specialist in safety. I have yet to meet a safety man who would turn down an invitation to come into a neighboring plant in the finest spirit of co-operation to advise and consult without any thought of personal profit. The industrial safety movement has largely been built by these safety men who have given freely of their time—serving on committees in the development of standards and safe practices, exchanging safety experiences, and ever realizing

that accident prevention is above competition.

Next, I mentioned the service to which an employer is entitled from the safety engineering department of his insurance company. The leaders in the workmen's compensation insurance field employ safety engineers and industrial hygienists and are prepared to render a personalized service to fit the needs of their clients.

Perhaps one of the most overlooked groups are the makers and salesmen of safety devices. The safety equipment manufacturers found out years ago that, before a particular safety device could be sold, a market had to be created, a safety consciousness had to be developed in the minds of the industrialists upon whom they called. They became *salesmen of safety*, rather than of devices. Many safety equipment salesmen are ex-safety directors. Others, by benefit of their wide experience with a large number and great variety of industries, by their constant contact with successful safety engineers, have gathered valuable experiences and have at their fingertips a great variety of safety information. I know of a safety shoe salesman who helped solve a punch press guarding problem, of an expert on saw guards who can give a convincing talk to a group of foremen on eye protection. These experts on a great variety of safety subjects outside of their particular field are available for the asking. They think, live, and breathe safety.

In 27 states and in several cities, health departments maintain active industrial hygiene divisions. The doctors and industrial hygienists connected with these divisions are constantly making studies and surveys in the field of industrial health and are available to any industrial plant for advice on industrial health and sanitation, as well as on specific occupational disease control. There is usually a close relationship between these hygiene divisions and the state factory inspection division, so that factory inspectors confronted in their day-by-day work with a difficult hygiene problem can get expert advice from, or bring into the plant, doctors or engineers from the industrial hygiene division.

And there are others willing to help —representatives and volunteer officers of the local safety council; the services of the local Red Cross chapter available for employee training in first aid—by the way, a fine adjunct to a safety program; professors in engineering schools and colleges, many of whom are experts on safety. In the mining game the U. S. Bureau of Mines and various state departments of mines and various state departments of mines will send men to consult and advise operators on safe work practices and accident hazard elimination.

Free safety advice is no further than your telephone or letterheads. Find out if there are any "accidents waiting to happen" in your plant.

"THE LETTER OF THE LAW"

[*Continued from page 18*]

were all held to be "accidental" injuries under compensation statutes, rather than non-compensable "occupational diseases" by reason of the sudden ways in which incurred.

Coverage by Reason of Employer's Negligence

A large number of cases have made awards under compensation acts, for disabilities resulting from disease, because the employer involved was negligent. The theory of these cases is that a disease is not truly "occupational," if it could have been prevented by proper precautions, or by the use of known safety measures or devices.

An employee who contracted pulmonary asbestosis after working five months, by reason of the failure of his employer to provide a dusting or suction system ordinarily provided in similar factories, brought a common law action for his injury under the belief that he had an occupational disease which was non-compensable under the Workmen's Compensation statute. The case was dismissed because the court said the compensation act covered the injury—that it was not an occupational disease because it did not result to employees in such occupations when due care for their safety is exercised by employers.[11]

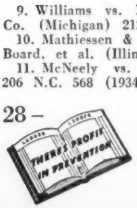
Similarly, where tuberculosis was brought on by the inhalation of gas, the defense that the disease was "occupational," and therefore not compensable under the act, was rejected. The employer had failed to take adequate preventive precautions, and the court said, "An employer may avail himself of the defense of occupational disease only when using due diligence to protect employee from hazards calculated to injure."[12]

Coverage by Liberal Interpretation of Compensation Statute

The State of Massachusetts' Workmen's Compensation Statute did not make mention of diseases. The requisite for compensation under its act, was that the injury "arise out of the employment." In a case involving "optic neuritis," resulting from the inhalation of poisonous gases while tending furnaces,[13] and in one dealing with lead poisoning, developed after twenty years work as a lead grinder,[14] the Supreme Court of that State held that it was the legislative intent that "occupational diseases" were compensable the same as any other injury. Other states have passed similarly worded statutes—"blanket" provision for all industrial disabilities.[15]

Definitely, management's liability is not limited by the letter of the law; that the courts in the various jurisdictions tend to allow claims in cases where there has been negligence on the part of the employer in furnishing protective safeguards to employees; and that even in states where there is no occupational disease legislation at the present time, the employer's liability for such diseases may rest on a common law basis.

9. Williams vs. Missouri Valley Bridge & Iron Co. (Michigan) 212 Mich. 150 (1920)
10. Mathiessen & Hegeler Zinc Co. vs. Industrial Board, et al. (Illinois) 284 Ill. 378; 120 N.E. 249
11. McNeely vs. Carolina Asbestos Co. (N.C.) 206 N.C. 568 (1934)
12. Barron vs. Texas Employer's Ins. Ass'n (Texas) 36 S.W. (2nd) 464 (1931)
13. Herle's case (Mass.) 217 Mass. 223.
14. Johnson's case (Mass.) 217 Mass. 388
15. California, Connecticut, Wisconsin



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HAZARDS

Right off the Docket

The trend of litigation on workmen's health and accident compensation is reflected in these briefs of the latest and most representative cases coming to trial in the intervals between issues. Familiarity with this trend is important to every industrialist.

Ohio Supreme Court Holds Silicosis Actionable When Resulting From Negligence

TWO civil suits were brought in Ohio for damages resulting from silicosis on the ground that the disease was caused by the employer's negligence in failing to provide a safe place to work. These cases arose before silicosis was made compensable in Ohio under the Workmen's Compensation Act, in 1937. Judgments had previously been rendered in these suits in lower courts in favor of the employer. These judgements were based on the fact that the Ohio Supreme Court had previously ruled that an employee could not institute common law action in order to establish the right to damages for occupational diseases which were not compensable under the Workmen's Compensation Act.

By a four to three decision in the cases cited herein, the previous holdings were overruled, and the Ohio Supreme Court held that an action in common law could be brought for damages resulting from an occupational disease not compensable under the compensation act, if the disease was directly caused by the employer's negligence.

In a concise and cogent majority opinion, written by Judge Roy H. Williams, may be found a rare fusing of the dictates of social justice, with the fine technical demands of the law. Refuting the contention that the constitutional and statutory provisions had left the injured workers without remedy, Judge Williams wrote: "The language to be construed is general in character; and the letter should not prevail over the spirit, for the polestar of interpretation is the intent of the provisions.

"Since the underlying purpose of compensation is to make industry bear the burden of human wreckage by paying stated awards for injury and loss of life in the course of employment, the court should avoid a strained construction which would leave many employees, who are blameless victims of their employer's torts, without either damages or compensation and absolutely remediless. . . . The true objective of compensation could hardly be attained by giving the language a meaning that would work injustice when another course lies open consistent with the spirit manifested in all constitutional and statutory provisions when considered together."

Triff vs. Nat'l Bronze & Aluminum Foundry Co.; Smith vs. Marion Brass & Bronze Foundry—(Ohio) 135 Ohio State 191 (March 29, 1939)

Digested and compiled by
HILTON E. ROBERTS
Member Ohio and New York Bars

Heart Dilatation Held Compensable

The claimant worked for two years in the defendant's milling company, his work consisting principally of unloading and handling sacks of feed and grain weighing 100 to 200 lbs. apiece. One day, while lifting a sack of grain, he felt a pain in the region of his heart. A doctor's examination disclosed that he was suffering with an

unquestionably acute dilatation of the heart.

The compensation board denied an award on the ground that the disability was not due to injury received in the course of and resulting from employment. In reversing this holding, the court said that the pain felt while lifting one sack, and the medical testimony to the effect that the dilatation resulted from a "little unusual lift," was sufficient proof that the disability came from a definite, isolated, unfortuitous occurrence, and was a compensable "personal injury" under the act.

Gilbert vs. State Compensation Commissioner—(West Va.) 1 S.E. 2nd 167 (January, 1939)

Lead Poisoning Not Occupational Disease; Faulty Masks Cause Injury

The employee worked for an iron and steel company and, while placing a large quantity of lead in a furnace, he was stricken with acute lead poisoning. He had been engaged in the same work for five years, and previously had been treated for lead poisoning. There was testimony that the masks furnished the workers were old and inadequate to protect them from the fumes.

The court held the lead poisoning to be an "accidental injury" rather than an "occupational disease," because of the exposure to an unusual volume of fumes, and because the injury might have been prevented by the exercise of due care and caution by the employer.

*Casualty Underwriters vs. Flores * (Texas) 125 S.W. 2nd 371 (February 1939)*

Failure to Use "Wet Drills" Leads to Silicosis Award

After five years work in the employer's lode mine, the employee was stricken with silicosis. Silicosis, as an "occupational disease" was not compensable in Idaho, but an award was made in this case, because of the failure of the employer to take proper precautions to protect its workers.

The court said; The authorities all agree that silicosis is in large part preventable by one device or another; that is, by not permitting the silica dust to enter the lungs of the worker at all, or at least in such small quantities as not to be injurious. The evidence conclusively shows that the employer, by its own experience, in its own mine, knew that by the use of wet drills the hazard could have been done away with, or at least greatly lessened. Thus, under the circumstances of this case the worker did not suffer an occupational disease under the Idaho Compensation act, because an occupational disease is one which inheres in the particular employment and cannot by reasonable means be prevented.

Brown vs. St. Joseph Lead Co. (Idaho) 8 T Pacific 2nd 1000 (March, 1939)

"THE ACCEPTED STANDARD OF MERIT"

PLY FOR PREVENTION OF INDUSTRIAL SKIN DISEASES

Protects Against Hydro-Carbon and Petroleum Solvents Acids and Caustics

Send For Our New 4th Edition Descriptive Book Just Off the Press

MILBURN CO., DETROIT, MICH.

DISTRIBUTORS IN ALL PRINCIPAL INDUSTRIAL AREAS

Some Chief Medical Aspects of the Industrial Dermatoses

Planned Records and Physical Examinations are Important Factors in Prevention of the Tolls of this Hazard

By STUART F. MEEK, M.D.
Chrysler Corporation

OCCUPATIONAL dermatoses usually account for 10 to 12 per cent of all skin diseases and approximately 65 per cent of all compensable industrial disease apart from accidents. These skin diseases also have their effects on workman efficiency, morale, absenteeism, medical costs of diagnosis and treatment. For these reasons, as well as others, the problem of controlling or preventing occupational dermatitis merits the attention of everyone concerned with this problem.

Carefully planned medical records are essential for the usual medical and legal requirements. Additionally, such records should be designed so they will serve as an index of progress. Adequate medical records will provide a means for determining the incidence of various types of dermatoses and relate such indices to occupations or specific exposures. Only by such means can the physician report intelligently to his management regarding the increase or decrease of dermatoses in various exposures. An analysis of records at the close of each productive season or other suitable period will serve to designate departments or operations most needful of attention and expenditures leading to control or elimination of skin irritants. A further function of such records is to serve as a guide in advising management as to safe working assignments for individual employees, dependent upon the history of previous skin disease or particular type of skin.

Pre-employment and periodic physical examinations are necessary complements to the medical record. Ideally, the pre-employment examination affords an opportunity to elicit the history concerning previous skin disease, allergy, and previous occupations. At this time, the physician should classify the skin as to reaction type. The completed record of history and examination enables the physician to advise safe job assignment. It is now well known that Negroes and brunets are more resistant to skin irritants than are blonds. Latin types, having thick, dark oily skin, have a lower incidence of dermatoses than dry skin types when exposed to the action of volatile solvents and soaps. Occupational acne due to oils and waxes is more common among workers with excessive sebaceous secretions. Excessive hair on the forearms and legs predisposes to folliculitis from oils and greases. Excessive sweating, especially when combined with friction, may seriously impair skin resistance to irritants. In classifying a worker as to skin risk, personal habits of cleanliness are observed and evaluated because lack of

cleanliness is undoubtedly the most important predisposing cause of occupational dermatoses.

Pre-existing Diseases

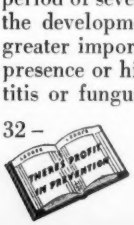
In any large group of new candidates for employment, a number of cases of pre-existing skin disease may be found. It is very important that these be accurately diagnosed before employment starts so that proper disposition can be made. Complete laboratory facilities should be available as aids to diagnosis. Arrangements should be made for the services of a dermatological consultant in all doubtful cases. Sound public health practice demands that all cases of communicable skin disease be excluded from employment until no longer dangerous to others. Certain non-contagious dermatoses which are unsightly must be given consideration as to possible reactions on the part of fellow employees. All pre-existing skin disease, especially itching types, must be evaluated in the light of possible aggravation by factors in the working environment.

It is well to distinguish between two general types of occupational skin disease, namely: (1) Dermatitis from primary irritants including pilosebaceous diseases, keratoses and cancer; and (2) sensitization dermatitis. The former may predispose to the latter but the latter is characterized by a specific cutaneous sensitivity. The use of patch tests in the pre-employment examination is of doubtful value in recognizing potential sensitization dermatitis, because an incubation period of several days is necessary for the development of sensitization. Of greater importance at that time is the presence or history of contact dermatitis or fungus disease.

The foregoing procedures are essentially preliminary and represent only one phase of a medical program designed to control and prevent dermatoses. The inauguration of such a campaign should also consist of a complete comprehensive survey of the plant to determine all substances capable of causing skin damage. Simultaneously, arrangements should be made whereby all new materials brought into manufacturing operations will be investigated as to possibility of skin effects. In determining substances likely to produce dermatoses, several methods of approach are available. Oftentimes, reference to the literature is most helpful; substances having caused dermatoses previously are apt to repeat their reactions under similar circumstances. The physician's industrial experience may serve in a similar manner. In the instance of new substances, it may be expedient to perform some experimental tests using animals or human volunteers. If it is elected to use the latter method, the usual technique employed is that of patch testing.

Patch Testing

Essentially, a patch test is performed by applying a small amount of the substance to be tested in contact with the skin and covering same with surgical gauze overlaid with rubber sheeting or other material which is proof against moisture and the substance under test. The whole is then firmly fixed to the skin by adhesive tape. Other substances, used as controls, are applied similarly at the same time. After a suitable lapse of time, such as twenty-four or forty-eight hours, the patch is removed and the skin reaction interpreted. The control patches are made at the same time as



an aid to avoid misinterpretation of reactions to adhesive tape or errors in technique. The time allowed for the test substance to react with the skin may vary, dependent upon the type of material. A large number of tests can be applied to one individual but care should be exercised in selection of comparable skin areas and regions free of skin lesions.

The accurate interpretation of patch test results is not easy and perhaps more properly is in the domain of dermatologists. Care is required to distinguish an individual sensitization response from a general type of reaction due to a primary irritant, especially where a small group of individuals are tested. Many persons react vigorously to adhesive tape. Others may be allergic, but their allergic manifestations vary greatly at different times and on different skin areas. An individual may react negatively to a substance and, upon further exposure, develop a sensitization to it within a few days or weeks. Errors may result from application of test material in a concentration either too great or too small. Furthermore, it is necessary to bear in mind constantly that the usual methods of patch testing are far from simulating actual working conditions of exposure. Sweating is changed from the normal because evaporation from the area of skin under test is inhibited. Friction is practically eliminated so that substances reacting negatively to patch test may prove harmful under working conditions where friction from clothes, protective clothing, or the work itself is a factor. This effect of friction is rather notable where metallic dusts and powders are encountered. Normal drying and oxidation effects are voided in patch testing.

Program of Industrial Hygiene Conference

THE tentative program of the meetings of the American Conference on Occupational Diseases and Industrial Hygiene, and the American Association of Industrial Physicians and Surgeons, meeting in Cleveland, June 5, 6, 7 and 8, is announced as:

Monday, June 5 (non-technical program)—Dr. Clarence D. Selby, "Conservation of Health In Industry"; Dr. R. R. Sayers, "Health of Workers"; Mr. G. W. Cannon, "The Employer's Appraisal of Occupational Hygiene"; Dr. D. B. Dill, "Fatigue in Industry."

Tuesday, June 6 (technical sessions)—Mr. William P. Yant, presiding—Mr. E. C. Barnes, "Possibilities of Control of Lead Exposure"; Mr. J. W. Fehnel, "Air Sampling of Asbestos Dust"; Mr. H. H. Schrenk, "Control of Dusts In Mines"; Drs. G. C. Harrold and L. E. Gordon, "Use of Interferometer For Two Component Mixtures"; Dr. R. A. Kehoe, "Lead Absorption vs. Lead Poisoning"; Drs. L. Silverman and G. Reece, "Determination of Solvents in Air." A buffet dinner will be held Tuesday evening at Nela Park at which time a demonstration of lighting research will be given by Dr. M. Luckeish and Mr. F. Moss.

Wednesday, June 7 (American Association of Industrial Physicians & Surgeons)—Dr. M. N. Newquist, "Medical Service for The Small Industrial Plant"; Dr. H. W. Lawrence, "Relationship of Industrial Medical Dept. to Other Personnel Activities."

Thursday, June 8—Dr. David H. Gillespie, "Treatment of Hernia"; Dr. Sidney, McCurdy, "The Relation of Trauma to Disease and Its Compensability."

Acknowledgement

"Cyanide Fumes in the Plating Room," by Nathaniel Hall; "Health Hazards in Chromium Plating," by J. J. Bloomfield and W. Blum; and "Health Hazards and Their Control in the Electric Plating Industry," by H. G. Dyktor and John Buxell, were omitted as references for the article "Hazards & Safety in Electro Plating" which appeared in the February Issue.

New Produc

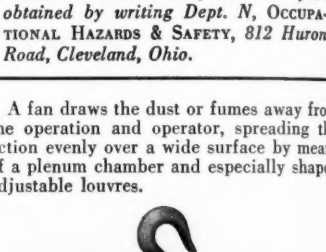
Additional information and descriptive literature on any of the products mentioned in this service department may be obtained by writing Dept. N, OCCUPATIONAL HAZARDS & SAFETY, *812 Huron Road, Cleveland, Ohio.*

NEW FOUNDRY VENTILATION

A "UNI-FLO" hood for ventilating shake-outs, knock-outs, gyrating screens, swing grinders and other dust and fume creating operations in foundries has been introduced by the Claude B. Schneible Co.

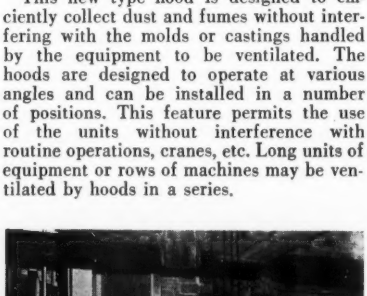
This new type hood is designed to efficiently collect dust and fumes without interfering with the molds or castings handled by the equipment to be ventilated. The hoods are designed to operate at various angles and can be installed in a number of positions. This feature permits the use of the units without interference with routine operations, cranes, etc. Long units of equipment or rows of machines may be ventilated by hoods in a series.

A fan draws the dust or fumes away from the operation and operator, spreading the action evenly over a wide surface by means of a plenum chamber and especially shaped adjustable louvres.



PORTABLE PLUG-IN HOIST

A new portable electric hoist that runs on an ordinary light circuit or 3-phase power line has been announced by Chisholm-Moore Hoist Corp. Compact design and ease of operation make this hoist espe-



IN THE FIELD

Statements made in connection with any product mentioned in this service department are based on manufacturers' claims. Although these claims are believed to be true, this magazine does not guarantee that to be the case.

cially suitable for service on production lines in large plants.

Upper and lower safety stops automatically limit travel of load hook. Brake is quick-acting, positive, preventing drifting of loads. Herculoy "double duty" chain is extra strong and flexible. Comet hoist is offered in four capacities and in several different speeds.

PUNCH PRESS HAND PROTECTOR

The Positive Safety Mfg. Co. has developed a safety device for punch presses designed to keep the operator's hands out of the danger zone while press is operating. Steel-cored cables pull the operator's hands away from the die during the stroke of the ram. The device may be applied to punch presses, toggle presses, drop hammers and embossing presses.

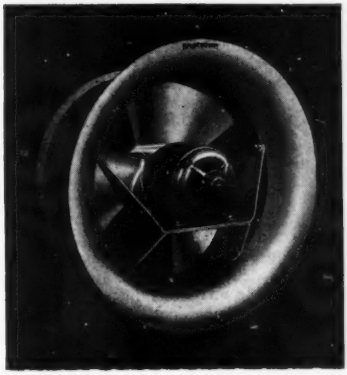
The device does not interfere with the normal operation of the press. The pull-back is adjustable in conformity with the dies, and there is no jerking motion on the operator's hands unless he is in actual danger. The equipment may be mounted on the floor, or from a beam or the ceiling.

TWO-SPEED PORTABLE BLOWER

A new 2-speed portable electric blower has been developed by Skilsaw, Inc. Features of this new blower are the increased air output, permitting wider industrial application with portable units; and the additional safety offered with the 2-speed control. By starting the blower on the low speed, the danger of the operator being thrown off balance is reduced. Switching to the high speed is accomplished without much additional torque. Blower developed velocity of both 20,500 and 26,000 lineal ft., per minute, with a capacity of both 125 and 176½ cu. ft. per minute, and a water lift (static pressure) of both 36 and 48 in.

HIGH PRESSURE FAN

The outstanding advantage of the new "Axiflo" pressure fan, introduced by the B. F. Sturtevant Co., is the ability the fan is said to have to operate against wind

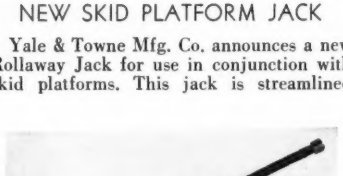


resistance or the resistance of filters, baffles, discharge conduits, etc. Blades are pitched in a manner so that, regardless of wind direction or velocity or fan location, there is no appreciable effect on air delivery.

Principal use of this fan is the moving of large volumes of air against resistance, or where space requirements call for a compact but rugged unit. Adaptable to many industrial uses, including fume, dust or vapor removal. Casing is heavily built and fitted with streamline inlet; wheel is of solid and integrally cast heat-treated aluminum alloy, which is non-corrosive under the action of many acid content chemical fumes. Eleven sizes are available, with capacities up to 75,000 feet per minute.

NEW SKID PLATFORM JACK

Yale & Towne Mfg. Co. announces a new Rollaway Jack for use in conjunction with skid platforms. This jack is streamlined



and mounted on rubber-tired wheels revolving on Hyatt roller bearings set on a high carbon axle. All main engaging members are of heat-treated alloy steel. The handle is the Yale "safeti-sure" balanced type—with an equalizing spring enclosed inside the tube. This feature forces the handle upright when the platform is elevated, preventing handle from falling to the ground, and becoming an obstruction.

SOLUTION STEAM GUN

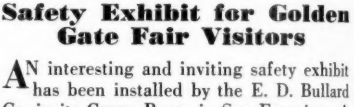
Oakite Products, Inc. announces a solution-lifting steam gun, for use with 30 or more pounds available steam pressure, to clean equipment either for appearance or sanitary purposes; to prepare equipment for repainting or refinishing; or to facilitate subsequent mechanical overhauling. With the use of the improved gun, a solution may be lifted to a height of about 12 feet without the need for pressure tanks, pump or elevated solution tank.

AUTOMATIC SAFETY CHOCK

An automatic safety checking device for preventing the backward rolling of tractor-trailer outfits on hills, steep-grades, etc., when motor or brakes fail, or where there is poor traction, has been introduced by the Homobile Co. The device is operated from the driver's seat, and a quick pull on a control cable instantly drops the check to the ground, preventing the outfit from slipping or rolling backward. The device is a strongly built cradle, attached to the rear axle of the trailer, and operates progressively until the entire weight of the load is taken off the wheels and supported by the chock. Angle iron cleats bear directly on the road, preventing backward motion.

Safety Exhibit for Golden Gate Fair Visitors

AN interesting and inviting safety exhibit has been installed by the E. D. Bullard Co. in its Green Room in San Francisco. A feature of the exhibit is a newly developed presentation that establishes a measuring stick by which the value of safe practices may be judged. This presentation is made on the basis of dollars and cents costs of ac-



cidents and actual, monetary savings resulting from effective safety measures. The presentation is given by means of a series of illustrated cards, each dramatizing the cost of industrial injury. Latest developments in protective equipment are on display. Visitors are invited to visit the Green Room at 275 Eighth Street, San Francisco.

Questions and Answers

Individual answers are given to all questions on industrial health or accident matters. A few of the questions received from readers each month are published for their general interest.

Cost of Medical Service

I read with interest your article in the March issue of *Occupational Hazards & Safety* on the subject of "Medical Service to Small Plants."

Do you know of any additional literature on the subject of organization and cost of adequate medical service for small industries which includes pre-employment physical examination and supervision of first aid activities by a doctor?—*H.A.D., Baltimore, Md.*

A recent study conducted under the direction of the National Association of Manufacturers reveals some interesting and valuable information on the cost of installing and maintaining medical services in small plants. On page 23 of this study, a copy of which is enclosed, is included a table of the "Cost of Medical Care" to five small manufacturers.

It is suggested that you can receive additional information from the American Medical Association, Council on Industrial Health, 535 N. Dearborn Street, Chicago, Illinois; Metropolitan Life Insurance Co., 1 Madison Avenue, New York City; American College of Surgeons, 40 E. Erie Street, Chicago, Illinois, and the United States Public Health Service, Washington, D.C.

Classifying Health Hazards

Will you please send to us a brief and simple classification of industrial health hazards? Our safety committee is now carrying on a survey in our plant to determine the kind and extent of the health hazards involved in our materials and operations. We would like to have this classification as a basis from which to work.—*R.J.S., Louisville, Ky.*

Various authorities group the industrial health hazards into different classifications and in different manners. However, for your purpose, as a basic grouping we suggest the following two major classifications: (1) those health hazards created by contact with harmful substances; and (2) those which are created by harmful conditions. These two groups might well, for purposes of brevity and simplicity, be divided as follows:

Harmful Substances:

1. Dusts (organic and inorganic).
2. Gases, Vapors, Fumes and Mists.
3. Solids and Liquids.
4. Infective materials (Dermatoses Producers).

Harmful Conditions:

1. Excessive Heat, Cold and Moisture.
2. Excessive Light, or Glare.
3. Insufficient Illumination.
4. Compressed Air.
5. Confined Positions (Fatigue).
6. Eye and Ear Strain.
7. Irritation of the Skin.

Anent Exhaust Piping

What factors should be taken into consideration, from a pneumatic standpoint in the designing of an exhaust system of piping?—*L.P.G., St. Louis, Mo.*

From a pneumatic standpoint, the following are among the factors which should be considered in designing an exhaust system of piping:

1. The static suction at each hood.
2. The air volume entering each hood.
3. The directional flow of the air at each hood.
4. The velocity in each length of pipe.
5. The volume rate of flow in the pipe.
6. Total volume of air to be handled by fan.
7. Static suction at fan inlet.
8. Back pressure at fan outlet.

To make certain that the piping system meets legal requirements and provides adequate protection in the removal of dusts and fumes from operations, these factors must be determined with accuracy by competent persons. Furthermore, such determination is necessary to provide the most efficient power facilities for the effective functioning of the system.

SAFETY AND MAINTENANCE

[*Continued from page 11*]

ure of the human element, as well as those caused by lack of or failure of equipment, such as tools, scaffolds, slings, etc.

Considering the entire group of accident victims in a department, we can readily determine the part of the body that is affected by the greatest number of accidents. The next step is to divide the entire organization into their respective groups, such as electricians, carpenters, machinists, etc., to determine the group in that department responsible for the accidents in question. If the study to this point indicates a failure of the human element, the safety records, abilities and dispositions of the individuals in the faulty group are checked and the men transferred to work for which they are better suited.

If the accident has not been caused by the failure of the human element, the study is continued by checking the accident classification reports for the purpose of detecting mechanical faults of equipment, safety devices and tools. After the accident investigation is completed, the committee classifies the accident into one of the twelve standard classifications which we use.

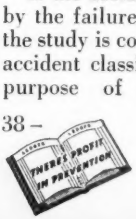
Safety Equipment and Devices

The elimination of improper tools and equipment will not only result in a better accident record, but will also enable a plant to achieve worthwhile economies. Home made wrenches are found in sections of many plants. Not all such tools become distorted by excess stresses in actual work. In most cases the failure of the tool is caused by filing or grinding the throat of the wrench to fit a nut or bolt which was greater than standard dimensions, and in other cases a condition of hammering the wrench jaws together to fit materials of less than standard.

The purchase of up-to-date and safe equipment originally, the maintenance of these to keep them in proper working order, and regular inspection will assure maximum safety to employees using such equipment and tools. It is the duty of the maintenance department to see that all tools and equipment being used in the plant are in proper working condition.

Pennsy Improves Its Safety Record

THE safety record of the Pennsylvania Railroad in 1938 showed that accidents to employees per million man-hours worked were reduced by 14%. The entire system showed only 5.88 accidents per million man-hours, as compared to 6.48 in 1937. Several splendid records were hung up by various divisions in the inter-departmental contests.



HIGH, WIDE AND HANDSOME

[*Continued from page 14*]

er pinching the fingers or hand while the ladder is being opened or closed. There are available today spreaders which do not present this hazard.

Platform or Safety Ladders—One form of step ladder which has come into popular use in industry is the safety platform ladder. The advantage of this type of ladder on jobs of a fixed height is that it gives the worker or workers on the platform considerable freedom. A solid working platform, guarded on three sides, is a feature of this type ladder. When used in pairs, the platform type ladder provides a foundation for scaffolds.

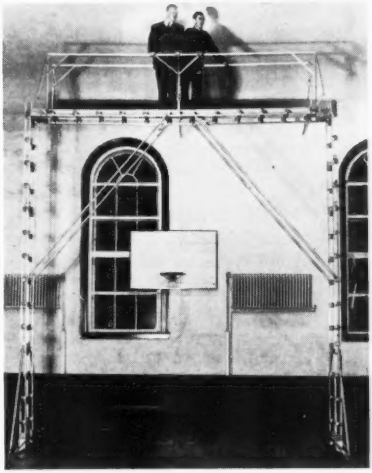
Extension Ladder—This type of ladder, essentially two single ladders, has the advantage of enabling workers to reach heights of from 30 to 60 feet. They should be equipped with a metal shackle, pulley and rope, and two automatic locks. The ladder code of the A.S.A. recommends that a 3 foot lap should be allowed up to approximately 38 feet, a 4 foot lap for heights of 38 to 44 feet, and 5 foot lap for 46 feet and up. For a three section ladder, a lap of 4 feet for heights of 46 feet and up is recommended. Each time that extension ladders are required, the pulley, shackles and automatic locking devices should be tested by moving the extension to make certain that they are in proper working order.

Extension Trestle Ladders—This type of ladder is frequently used in maintenance work. They are commonly used in sets of two or four as supports for planks and stages. Proper precaution should be taken to see that the four legs rest on an even and solid surface and that the spreaders and locks on the middle sliding section are in perfect working order. This type ladder should not be used for heights of more than 20 feet. The advantages of the extension trestle ladder are that they will support considerable weight and offer exceptional freedom of movement in working on a large overhead area.

Wherever it is possible and practical, fixed ladders of sound construction, preferably metal, should be used. They should be securely fastened at the top and bottom, and to the wall or other support in sufficient places to make them solid. Hand rails should be provided along the sides, and these should extend beyond the top rung to enable the worker to step onto the elevated platform with safety.

Scaffolding

Various types of construction, modernization and maintenance work



Light weight and convenient collapse for storage mark the modern safety ladder.
Photo courtesy Aluminum Ladder Co.

require the use of scaffolding. Either wood or metal, or a combination of the two, may be used safely for scaffolds. Scaffolds should be considered only as temporary structures to be erected and knocked down at the beginning and completion of each job. However, because they are used as a temporary equipment does not preclude the importance of strong materials and careful workmanship in their construction.

The purpose of scaffolds, to provide a safe and convenient working platform which can be quickly erected and dismantled, is oftentimes overlooked in their construction. Scaffold built for temporary work is sometimes allowed to remain in position and at a later time used for work heavier than that for which it was originally designed. As a result, it fails to support the weight placed upon it with serious consequences. As in selecting ladders, the scaffold should be erected to fit the job, not on the basis of economy or ease of erection and dismantling.

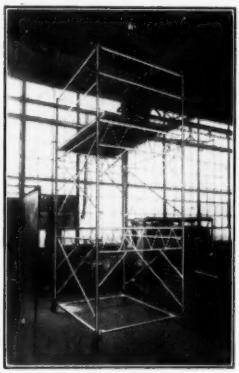


Photo by courtesy of Steel Scaffolding Company.

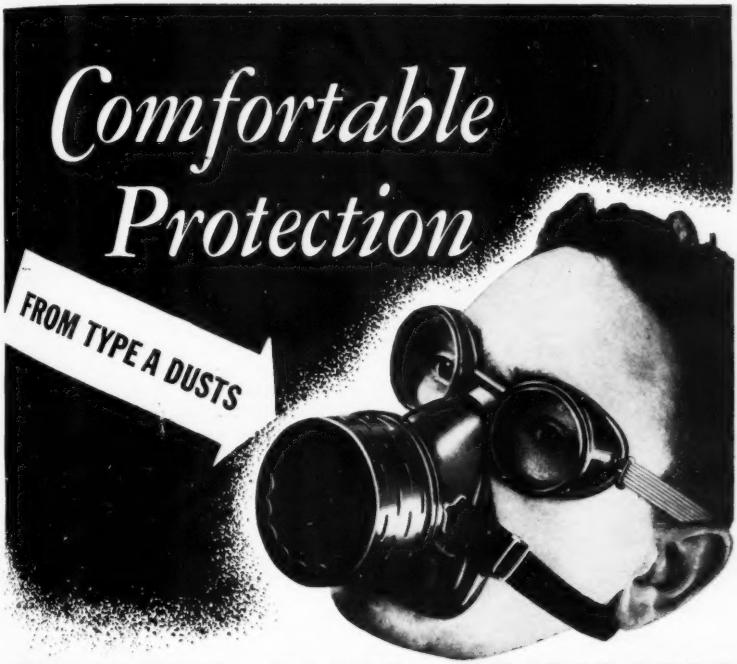
Various types of work, because of their location, do not permit a scaffold to be erected from the ground. In such cases the block and fall, or swing scaffold, is used. Ropes should be of the best quality and the working platforms of adequate thickness and strength. One of the most important safeguards with the use of the block and fall type scaffold is to see that the equipment is securely fastened to strong supports, and all other anchorages of suitable material and in proper working condition.

Ladder Shoes

To make certain that a ladder will not slide and also that it has a firm footing, several different types of ladder shoes may be used. These shoes, placed on the feet of the ladder, hold it securely through friction, sharp points, or suction. If the surface upon which the legs of the ladder rest tends to be slippery or consists of cinders or stones, the proper type of ladder shoe will serve to keep it in position.

Common Sense Factor

Adhering to the five rules, outlined previously in this article, will do much to safeguard employees working in high places from ladders or scaffolds. However, regardless of how soundly constructed a ladder may be, common sense must be exercised in the use of such equipment. All employees, who in the course of their work may be required to use ladders or scaffolds, should be instructed as to the safe practices involved. Furthermore, some one person should be charged with the responsibility of making regular check-ups of ladders and scaffolds to see that they are in good condition and all parts in proper working order. Unless they are of metal construction, attention should be paid their rings and joints, where rusting nails cause trouble. Periodic re-painting of both metal and wood units is advisable.



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